

EPAUnited States Environmental Protection Agency
Washington, DC 20460**Work Assignment**

Work Assignment Number

4-13

☐

Other

☐

Amendment Number

Contract Number

EP-D-11-006

Contract Period 04/29/2011 To 03/31/2015

Base

Option Period Number 3

Title of Work Assignment/SF Site Name

Develop Life Cycle Inventories

Contractor

EASTERN RESEARCH GROUP, INC.

Specify Section and paragraph of Contract SOW

Purpose

☒

Work Assignment

☐

Work Assignment Close-Out

☐

Work Assignment Amendment

☐

Incremental Funding

☒

Work Plan Approval

Period of Performance

From 12/01/2014 To 03/31/2015

Comments

The work plan dated 12/22/14 has been reviewed and we concur with the labor hours (420), ODCs, cost (\$43,270), and completion date of 3/31/15, as specified. The contractor will not perform the QAPP under Task 2 of the WA.

☐

Superfund

Accounting and Appropriations Data

☒

Non-Superfund

Note: To report additional accounting and appropriations data use EPA Form 1900-65A.

SFO

(Max 2)

☐

g	DCN (Max 6)	Budget FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period 04/29/2011 To 03/31/2015 Cost/Fee \$0.00 LOE 0

This Action \$43,270.00 420

Total \$43,270.00 420

Work Plan / Cost Estimate Approvals

Contractor W/P Dated 12/22/2014 Cost/Fee \$43,270.00 LOE 420

Cumulative Approved Cost/Fee \$43,270.00 LOE 420

Work Assignment Manager Name David Meyer

Branch/Mail Code:

Phone Number 513-569-7194

FAX Number

(Signature)

(Date)

Project Officer Name Margaret Dougherty

Branch/Mail Code:

Phone Number 919-541-2344

FAX Number

(Signature)

(Date)

Other Agency Official Name

Branch/Mail Code:

Phone Number:

FAX Number:

(Signature)

(Date)

Contracting Official Name Rodney-Daryl Jones

Branch/Mail Code:

Phone Number 919-541-3112

FAX Number

(Signature)

(Date)

3-9-2015

EPAUnited States Environmental Protection Agency
Washington, DC 20460**Work Assignment**

Work Assignment Number

4-13

☐ Other ☐ Amendment Number:Contract Number
EP-D-11-006

Contract Period 04/29/2011 To 03/31/2015

Title of Work Assignment/SF Site Name

Base Option Period Number 3

Develop Life Cycle Inventories

Contractor

EASTERN RESEARCH GROUP, INC.

Specify Section and paragraph of Contract SOW

Purpose



Work Assignment



Work Assignment Close-Out



Work Assignment Amendment



Incremental Funding



Work Plan Approval

Period of Performance

From 12/01/2014 To 03/31/2015

Comments

This is the initiation of a work assignment for Option Period III. (200) Hours have been authorized for the Work Plan and also for the work to begin. This work does not duplicate any work previously performed or is currently being performed.



Superfund

Accounting and Appropriations Data



Non-Superfund

Note: To report additional accounting and appropriations data use EPA Form 1900-BSA.

SFO
(Max 7)

	DCN (Max 6)	Budget FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										

Authorized Work Assignment Ceiling

Contract Period

Cost/Fee

LOE 0

04/29/2011 To 03/31/2015

This Action

0

Total

0

Work Plan / Cost Estimate Approvals

Contractor VAP Dated

Cost/Fee

LOE

Cumulative Approved

Cost/Fee

LOE

Work Assignment Manager Name David Meyer

Branch/Mail Code

(Signature)

(Date)

Phone Number 513-569-7194

FAX Number:

Project Officer Name Margaret Dougherty

Branch/Mail Code

(Signature)

(Date)

Phone Number 919-541-2344

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Other Agency Official Name

Branch/Mail Code

(Signature)

(Date)

Phone Number:

FAX Number:

Contracting Official Name Rodney-Daryl Jones

Branch/Mail Code

(Signature)

NOV 21 2014
(Date)

Phone Number 919-541-3112

FAX Number:

Statement of Work

I. Title: Methods to Develop Life Cycle Inventories Using Data Mining

Contractor Name: Eastern Research Group

Contract #: EP-D-11-006

WA#: 4-13

WAM: David Meyer, 513-569-7111

Alt WAM: Diana Bless, 513-569-7674

II. Background

The Systems Analysis Branch (SAB) in the Sustainable Technology Division of EPA's Office of Research and Development (ORD), National Risk Management Research Laboratory (NRMRL) is responsible for developing tools to help promote the sustainable manufacture and use of chemicals, processes, and products. This is accomplished by applying a life cycle perspective to environmental assessment to examine multiple impacts, including climate change, resource depletion, and human and ecological health.

The ability to meet Agency needs to perform a large volume of life-cycle-based chemical evaluations in a short timeframe will require large amounts of data describing the life cycles of various chemicals and products. In the absence of primary data supplied directly by industry, there is a need to estimate this information within a level of uncertainty that supports screening-level decisions by Program Offices and Regions. This work assignment will support research in the Office of Research and Development's (ORD) Chemical Safety and Sustainability (CSS) National Research Program designed to evaluate the potential impact of a chemical on human health based on understanding the possible release and exposure scenarios for this chemical throughout its life cycle (material acquisition, manufacturing, use, disposal and/or recycle, and all necessary transportation). This information can then be combined with knowledge of material and energy flows throughout the life cycle to support broader decisions promoting safe and sustainable chemical use. However, single chemicals rarely enter the economy for use as separate entities and instead are combined with other materials to produce consumer products. Therefore, an evaluation of a single product containing the chemical of concern may require a life cycle inventory (LCI) that simultaneously describes multiple chemicals and materials. This work assignment will develop methods for to compile EPA data as life cycle inventory (LCI) by considering data needs on two scales: chemical level and product level.

At the chemical level, the inventory for a chemical of concern accounts for all material and energy flows attributed to the manufacture, use, and end-of-life (EOL) treatment of the chemical. For CSS research, the inventory must specifically capture all potential emissions/releases that could result in a near-field or situation-specific exposure. To broaden the scope of applicability, the inventory data should combine the emissions inventory with knowledge about the various processes within the life cycle stages such as unit processes during manufacturing and end-of-life treatment of the chemical. This data could include feedstock material usage, energy usage, and waste types, phases and generation rates. This approach will yield LCA models that capture indirect human health and environmental impacts alongside the near-field and situation-specific impacts generated by the chemical itself. For example, more comprehensive analysis of a chemical of concern would be needed if processes within its life cycle led to impacts related to the generation and emission of toxic compounds, such as dioxins.

At the product level, the inventory should, in theory, account for all material and energy flows throughout the life cycle of the product of interest containing the chemical of concern. However, the level of detail and

certainty required for the chemical of concern will be much greater than for the other chemicals and materials in the product. For example, consider a laptop containing a brominated flame retardant (BFR) as part of its enclosure. A decision regarding the use of this BFR may be acceptable based on an inventory that contains detailed chemical inventory for the BFR and more generic chemical inventory for the common materials comprising the laptop, such as plastic and metals. For generic inventory, data for a "fossil plastic" could be developed as an average of specific plastics like polycarbonate, polystyrene, and polyvinyl alcohol. Similarly, the use of a common solvent such as methanol during product manufacturing may be represented as an average "alcoholic solvent."

Numerous data sources within the Agency and across the Federal government provide necessary pieces for a life cycle inventory. For example, the premanufacturing notification (PMN) process requires chemical manufacturers to submit data describing the production of a chemical while the Toxics Release Inventory can provide emissions data for selected industrial sectors. Within ORD, CSS has developed databases such as CPCAT that make it possible to identify the composition of consumer products. To enable rapid LCI modeling using such data sources, it is necessary to understand where and how this data is stored and develop the tools to extract the data and compile it as an LCI. This approach to data mining presents a challenge in that some data sources, such as PMN data, will be subject to the rules governing confidential business information (CBI). The data mining efforts of this work assignment will address this issue by adopting and refining the Generic Scenario Methodology developed and used by the Office of Chemical Safety and Pollution Prevention (OCSPP) to provide generic risk assessment data sets to support chemical evaluation during registration. The premise of the generic scenario model is that CBI data can be rolled up into industry average datasets that provide the necessary assessment function while protecting the sensitive nature of the data.

This work assignment is a continuation of research started with Eastern Research Group (ERG) under work assignment WA 3-06 of contract EP-W-10-014. A report discussing the potential use of the generic scenario approach for development of life cycle inventory was prepared by the contractor and submitted to EPA. Actual implementation of the approach was not included. This work assignment will involve assisting ORD with developing methods to compile publically shareable life cycle inventories using EPA data sources. The resulting datasets will provide highly accurate and detailed life cycle inventories and models for use in life cycle evaluations that are currently not available in the US. The modeling approaches developed in this work assignment will support assessment of a number of chemical, processes, and products within EPA. The purpose of this work assignment is to provide contractor support for the preparation of the regionalized life cycle datasets and impact models.

III. Tasks

Task 1: Prepare Work plan and Budget; manage Work Assignment, and Administrative Tasks

This task will involve the preparation of a work plan and budget, and the management of the work assignment. As specified in the contract, the contractor shall prepare a work plan within 15 calendar days of receipt of this assignment. The work plan shall describe the work to be performed, the technical approaches used for the various tasks, projected schedules, cost information, a staffing plan, and an outline of key deliverables on a task-by-task basis with expected due dates. As per the Contract, the contractor shall provide monthly progress reports. These reports shall include an accounting of the number of hours by PL level for each of the tasks of this work assignment. As directed by the EPA WACOR, the Contractor shall participate in discussions of the research by teleconference and/or webinar.

Task 2: Develop and Implement a Quality Assurance Plan for the Period of Performance

The contractor shall submit a QA Plan in writing describing the methods that will be used to verify and validate both the collection of data and the development of life cycle inventories using this data. The Contractor shall satisfy the EPA QA Plan requirements specified in the QA Plan template provide in Appendix 1 of the SOW as outlined in Attachment 1 to the SOW. The Contractor shall submit the QA plan within 30 days after submitting the workplan to the EPA.

Task 3: Identify Potential EPA Data Sources for Application to LCI

The Contractor shall review EPA data sources and create a list mapping suitable EPA data to relevant life cycle stages. The Contractor shall evaluate data sources from each programmatic office in EPA and compile a list of proposed datasets that describe components of typical life cycle inventory, including (but not limited to) material sources, chemical process descriptions, material and energy flows, waste and emissions flows, product use data, and waste treatment data. At the minimum, the Contractor will document the program office that maintains the dataset, the format of the stored dataset, whether or not the dataset is publically available, the type of inventory contained in the dataset, and, if possible, the number of chemicals, products, or processes included in the dataset.

Deliverable: The contractor shall deliver a list as described above of EPA data sources for use in LCI using an electronic format specified by the EPA WACOR.

Task 4: Develop and Demonstrate Methods to Construct Life Cycle Inventory Using EPA Data

The Contractor shall develop methods to construct life cycle inventory data sets using the data sources identified in Task 3. The first phase of this research will focus on identifying data issues such as confidential business information (CBI) protection and working with responsible program offices to manipulate the data into formats that can be publically shared. The Contractor shall start with the generic scenario (GS) approach developed for EPA's Office of Pollution Prevention and Toxics (OPPT) and used to create generic industry average data sets for risk assessment. The Contractor shall further develop and/or revise the GS approach to make it suitable for construction of LCI. If the GS approach is not suitable for an identified data issue, the Contractor shall develop new methods to address the issue.

The second phase of the research will focus on the electronic compilation of the various data sets to form life cycle inventory files. The EPA is developing a life cycle inventory database built on the Resource Description Framework (RDF). Ultimately, the methods developed in this task should provide a data inventory file in a format that can be added to the EPA database. The advantage of this approach is the ability to harmonize the data and store larger amounts of Meta data. The Contractor shall develop methods to convert the various data sets identified in Task 3 into an electronic format designated by the EPA WACOR and combine the necessary data into a life cycle inventory file. These methods should support automated inventory construction and updating.

The final phase of this research will involve demonstration of the methods developed in this task. The Contractor shall construct a life cycle inventory using the methods developed in this task for a chemical, product, or process as directed by the EPA WACOR.

Deliverable: The contractor shall deliver a report detailing methods to construct a life cycle inventory data set using EPA data sources. The report shall include a description of methods for addressing data issues such as CBI protection and procedures for automated conversion of EPA data into a format for use in EPA's life cycle inventory database. The contractor shall demonstrate the application of the methods in this task and deliver a life cycle inventory for a chemical, process, or product in an electronic format as specified by the EPA WACOR.

IV. Deliverables and Due Dates

The following table provides a schedule for delivery of requested deliverables organized by task.

Task	Deliverable	Schedule
<i>Task 1: Prepare Work plan and Budget, manage Work Assignment, and Administrative Tasks</i>		
	- Workplan	15 calendar days after receipt of work assignment (as per the contract)
	- Monthly Progress Reports	- as per the Contract
<i>Task 2: Develop and Implement a Quality Assurance Plan for the Period of Performance</i>		
	- Quality Assurance Project Plan describing data collection and reporting.	- 30 days after submission of workplan to EPA.
<i>Task 3: Identify Potential EPA Data Sources for Application to LCI</i>		
	- List of EPA data sources for LCI	- 90 days after submission of the Quality Assurance Plan
<i>Task 4: Develop and Demonstrate Methods to Construct Life Cycle Inventory Using EPA Data</i>		
	- Report describing methods to construct life cycle inventory data sets using EPA data. - Electronic copy of an example life cycle inventory	Draft copy 30 days prior to the end of the Period of Performance with final copy at the end of the Period of Performance

Appendix 1: Quality Assurance Project Plan Template

NRMRL QAPP REQUIREMENTS FOR SECONDARY DATA PROJECTS

GENERAL REQUIREMENTS: Include cover page, distribution list, approvals, and page numbers.

0. COVER PAGE

Include the Division/Branch, project title, revision number, EPA technical lead, QA category, organization responsible for QAPP preparation, and date.

1. PROJECT DESCRIPTION AND OBJECTIVES

- 1.1 Describe the process and/or environmental system to be evaluated.
- 1.2 State the purpose of the project and list specific project objective(s).

2. ORGANIZATION AND RESPONSIBILITIES

- 2.1 Identify all project personnel, including QA, and related responsibilities for each participating organization, as well as their relationship to other project participants.
- 2.2 Include a project schedule that includes key milestones.

3. SCIENTIFIC APPROACH

- 3.1 Identify the secondary data needed to meet the project objective(s). Specify requirements relating to the type of data, the age of data, geographical representation, temporal representation, and technological representation, as applicable.
- 3.2 Identify the source(s) for the secondary data. Discuss the rationale for selecting the source(s) identified. If a hierarchy of sources exists for the gathering of secondary data, specify that hierarchy.

4. QUALITY METRICS

- 4.1 Specify the quality requirements of the secondary data. These requirements must be appropriate for the intended use of the data. Address accuracy, precision, representativeness, completeness, and comparability, if applicable.
- 4.2 Describe the procedures for determining the quality of the secondary data.
- 4.3 If no project-specific data quality requirements exist, state this in the QAPP. If the quality of the secondary data will not be evaluated by EPA, require that a disclaimer be added to any project deliverable to indicate that EPA has not evaluated the quality of the secondary data for this specific application. Provide the wording for the disclaimer.

5. DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

- 5.1 Identify the data reporting requirements, including data reduction procedures specific to the project and applicable calculations and equations.
- 5.2 Describe data validation procedures used to ensure the reporting of accurate project data.

5.3 Describe how the data will be summarized or analyzed (e.g., qualitative analysis, descriptive or inferential statistics) to meet the project objective(s).

5.3.1 If descriptive statistics are proposed, state what tables, plots, and/or statistics (e.g., mean, median, standard error, minimum, and maximum values) will be used to summarize the data.

5.3.2 If an inferential method is proposed, indicate whether the method will be a hypothesis test, confidence interval, or confidence limit and describe how the method will be performed.

5.4 Describe data storage requirements for both hard copy and electronic data.

6. REPORTING

6.1 List and describe the deliverables expected from each project participant.

6.2 Specify the expected final product(s) that will be prepared for the project (e.g., journal article, final report, etc.). Specify the source(s) of the secondary data in any deliverable.

7. REFERENCES

Provide references in the body of the text either as footnotes or in a separate section.